

27



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/665,917	09/17/2003	Kouji Kataoka	16869G-086500US	7065
20350	7590	03/06/2006	EXAMINER	
TOWNSEND AND TOWNSEND AND CREW, LLP TWO EMBARCADERO CENTER EIGHTH FLOOR SAN FRANCISCO, CA 94111-3834			RENNER, CRAIG A	
			ART UNIT	PAPER NUMBER
			2652	

DATE MAILED: 03/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/665,917

Applicant(s)

KATAOKA, KOUJI

Examiner

Craig A. Renner

Art Unit

2652

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 7-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 17 September 2003.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of "Claim Group I (claims 1-6)" in the reply filed on 19 December 2005 is acknowledged. Accordingly, claims 7-16 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to one or more non-elected inventions/species, there being no allowable generic or linking claim.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

3. The drawings are objected to because of the following informalities

a. The drawings fail to comply with 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, "an anti-ferromagnetic layer having non-magnetic regions on both the ends thereof; first electrode layers disposed respectively on the non-magnetic regions of the anti-ferromagnetic layer; magnetic domain control layers disposed respectively on the ends of a stack of layers consisting of the lower magnetic shield, the lower gap layer, the first ferromagnetic layer, the non-magnetic layer, the second ferromagnetic layer, the anti-ferromagnetic layer, and the first electrode layers," set forth in independent claim 1 must

be shown or the feature(s) canceled from the claim(s) (emphasis added). No new matter should be entered.

b. The drawings fail to comply with 37 CFR 1.84(p)(5) because they include one or more reference signs not mentioned in the description. Note, for instance, "22c" (shown in FIG. 4, for instance), "23c" (shown in FIG. 4, for instance) and "24c" (shown in FIG. 4, for instance).

c. The drawings also fail to comply with 37 CFR 1.84(p)(5) because they do not include one or more reference signs mentioned in the description. Note, for instance, "21d" (disclosed as a "conductive layer" in line 1 of paragraph [0054] on page 13, for instance).

d. FIG 5(a) should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

Corrected drawing sheets in compliance with 37 CFR 1.121(d), and/or an amendment to the specification in compliance with 37 CFR 1.121(b) and/or an amendment to the claims in compliance with 37 CFR 1.121(c) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required

Art Unit: 2652

corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

5. The abstract of the disclosure is objected to because it does not "include that which is new in the art to which the invention pertains," i.e., the claimed elected invention. Appropriate correction is required. See MPEP § 608.01(b).

6. The disclosure is objected to because of the following informalities:

a. In line 23 of paragraph [0035] on page 8, "28 | per gap layer" should be changed to --28 | Upper gap layer-- in order to be consistent with the remainder of the disclosure.

b. In line 3 of paragraph [0039] on page 9, "pinning layer 12" should be changed to --pinning layer 12-- in order to be consistent with the remainder of the disclosure.

c. In line 8 of claim 1, "both the ends" should be changed to --both ends-- for better clarity.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 2-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. In line 2 of claim 2, it is indefinite as to which of the "non-magnetic regions" set forth in line 8 of independent claim 1 is being referenced by "the non-magnetic region".

b. In line 2 of claim 3, it is indefinite as to which of the "first electrode layers" set forth in line 10 of independent claim 1 is being referenced by "the first electrode layer".

c. In line 2 of claim 4, it is indefinite as to which of the "first electrode layers" set forth in line 10 of independent claim 1 is being referenced by "the first ... electrode layer".

d. In line 2 of claim 4 and lines 2-3 of claim 5, it is indefinite as to which of the "second electrode layers" set forth in line 16 of independent claim 1 is being referenced by each instance of "the second electrode layer".

Art Unit: 2652

e. In line 2 of claim 5, it is indefinite as to which of the "domain control layers" set forth in line 12 of independent claim 1 is being referenced by "the domain control layer".

f. In line 2 of claim 6, it is indefinite as to which of the "magnetic domain control layers" set forth in line 12 of independent claim 1 is being referenced by "the magnetic domain control layer".

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Han et al. (US 6,383,574).

Han teaches a composite magnetic head comprising a magnetoresistive head (FIG. 4, for instance) comprising a lower magnetic shield (at least a portion of 10, see lines 4-23 in column 6, for instance, i.e., "shield layer") disposed on a substrate (includes at least another portion of 10, see lines 4-23 in column 6, for instance, i.e., "base substrate"); a lower gap layer (includes at least another portion of 10, see lines 4-23 in column 6, for instance, i.e., "non-magnetic spacer"); a first ferromagnetic layer (14); a non-magnetic layer (16); a second ferromagnetic layer (18); an anti-

Art Unit: 2652

ferromagnetic layer (20) having regions (20a and 20b) on both ends thereof; first electrode layers (22a and 22b) disposed respectively on the regions of the anti-ferromagnetic layer; magnetic domain control layers (28a and 28b) disposed respectively on the ends of a stack of layers consisting of the lower magnetic shield, the lower gap layer, the first ferromagnetic layer, the non-magnetic layer, the second ferromagnetic layer, the anti-ferromagnetic layer, and the first electrode layers (as shown in FIG. 4, for instance); and second electrode layers (30a and 30b) disposed respectively on the magnetic domain control layers (as shown in FIG. 4, for instance) [as per claims 1 and 5]; wherein the region of the anti-ferromagnetic layer is formed by implanting impurities into the anti-ferromagnetic material (lines 30-31 in column 8, for instance) [as per claim 2];, wherein a width of the first electrode layer is 20 nm or less (lines 48-50 in column 7, for instance) [as per claim 3]; wherein the first and the second electrode layer contain one or more of elements of at least Au, Ta, W, Ru, Rh, Cu, Ti, Ag, Pt, Pd, Cr, In, Ir, Nb and Zr (lines 39-48 in column 7 and line 65 in column 9 thru line 7 in column 10, for instance, i.e., both include Ta, for instance) [as per claim 4]; and wherein a crystal orientation underlying layer (22c) is disposed below the magnetic domain control layer (as shown in FIG. 4, for instance). Han, however, does not explicitly state that the regions of the anti-ferromagnetic layer are “non-magnetic” as per claim 1-6; that the composite magnetic head further comprises “an upper magnetic shield disposed on the second electrode layers and the stack of layers by way of an upper gap layer; and an inductive magnetic head disposed on the magnetoresistive head by way of an insulation layer” as per claims 1-6; and further that the composite

Art Unit: 2652

magnetic head further comprises "a soft magnetic layer is disposed between the domain control layer and the second electrode layer" as per claim 5.

Han does however teach that pinned layer ion implanted regions (18a and 18b), which directly correspond to the ion implanted regions of the anti-ferromagnetic layer, are transformed into non-magnetic regions (lines 50-60 in column 8, for instance). Han also teaches application of the invention in a magnetic read/write head (lines 30-36 in column 1, for instance). Official notice is taken of the fact that is notoriously old and well known in the art to have a composite magnetic head further comprise an upper magnetic shield disposed on electrode layers and a stack of layers by way of an upper gap layer in the same field of endeavor for the purpose of protecting the head from stray flux. Official notice is also taken of the fact that it is notoriously old and well known in the art to have a composite magnetic head further comprise an inductive magnetic head disposed on a magnetoresistive head by way of an insulation layer in the same field of endeavor for the purpose of enabling information storage. Official notice is lastly taken of the fact that it is notoriously old and well known in the art to have a composite magnetic head further comprise a soft magnetic layer disposed between a domain control layer and an electrode layer in the same field of endeavor for the purpose of increasing stability. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have had the regions of the anti-ferromagnetic layer of Han be non-magnetic; to have had the composite magnetic head of Han further comprise an upper magnetic shield disposed on the second electrode layers and the stack of layers by way of an upper gap layer; to have had the composite magnetic head

Art Unit: 2652

of Han further comprise an inductive magnetic head disposed on the magnetoresistive head by way of an insulation layer; and to have had the composite magnetic head of Han further comprise a soft magnetic layer disposed between the domain control layer and the second electrode layer. The rationale is as follows:

One of ordinary skill in the art would have been motivated to have had the regions of the anti-ferromagnetic layer of Han be non-magnetic since a person of ordinary skill in the art would have realized that there is no need to maintain magnetism in the ion implanted regions of the anti-ferromagnetic layer since the pinned layer ion implanted regions, which directly correspond to the ion implanted regions of the anti-ferromagnetic layer, are transformed into non-magnetic regions, i.e., those regions of the pinned layer no longer require pinning by the anti-ferromagnetic layer.

One of ordinary skill in the art would have been motivated to have had the composite magnetic head of Han further comprise an upper magnetic shield disposed on the second electrode layers and the stack of layers by way of an upper gap layer since such protects the head from stray flux.

One of ordinary skill in the art would have been motivated to have had the composite magnetic head of Han further comprise an inductive magnetic head disposed on the magnetoresistive head by way of an insulation layer since such enables information storage, and since Han teaches application of the invention in a magnetic read/write head.

One of ordinary skill in the art would have been motivated to have had the composite magnetic head of Han further comprise a soft magnetic layer disposed

Art Unit: 2652

between the domain control layer and the second electrode layer since such increases stability.

Pertinent Prior Art

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. This includes Arnett et al. (US 6,483,672), which teaches a magnetoresistive head comprising a giant magnetoresistive element with non-magnetic regions on both ends thereof and electrode layers disposed respectively on the non-magnetic regions; and Lin (US 2004/0057163), which teaches a composite magnetic head comprising a magnetoresistive head with a lower magnetic shield disposed on a substrate, a lower gap layer, a giant magnetoresistive sensor having regions on both ends thereof, first electrode layers disposed respectively on the regions, magnetic domain control layers disposed respectively on the first electrode layers, second electrode layers disposed respectively on the magnetic domain control layers, and an upper magnetic shield disposed on the second electrode layers by way of an upper gap layer; and an inductive magnetic head disposed on the magnetoresistive head.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig A. Renner whose telephone number is (571) 272-7580. The examiner can normally be reached on Tuesday-Friday 9:00 AM - 7:30 PM.

Art Unit: 2652

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (571) 272-7579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Craig A. Renner
Primary Examiner
Art Unit 2652

CAR